THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

SEPTEMBER, 1895.

TWO CASES OF FAT-NECROSIS.[1]

BY CHARLES G. STOCKTON, M.D.,
PROFESSOR OF MEDICINE, UNIVERSITY OF BUFFALO;

AND

HERBERT U. WILLIAMS, M.D.,
PROFESSOR OF PATHOLOGY, UNIVERSITY OF BUFFALO.

E. H., a male Swede, came to America when eight years old. His parents lived beyond seventy. His early life was spent on a farm; his latter life in a large and lucrative business. He was a stout man of the blonde type, nervous and always active. He had suffered from otitis media, the loss of the right ear-drum, and had for two years experienced the sensation of giddiness, but no tinnitus.

He tired easily, was flatulent, and slightly constipated. The pulse was frequent and poorly sustained; the cardiac impulse was obscure and felt to the left of the nipple-line. In twenty-four hours he voided 1428 c.cm. of urine, acid in reaction, containing 15.708 gm. of urea, no albumin, no sugar, and was negative microscopically.

Under the influence of massage, baths, and a regular diet continued one year, his general condition improved, and he was persuaded to take a European trip for rest. The change was enjoyed, and he reported steady improvement, although he apparently displayed as a tourist his characteristic activity. On the eve of his return he visited the canal at Manchester, and reached Liverpool chilled and exhausted. He ate heartily at dinner, but soon after was seized with vomiting, retention of urine, and abdominal tenderness and pain. Dr. W. S. Crawford, of Liverpool, catheterized him, and during the night administered 7/8 grain of morphine hypodermatically. The temperature was 100°, and the circulation feeble. The vomiting continued, with moderate pain and great thirst. The doctor writes me that he believed that the patient suffered from subacute peritonitis. Feeling slightly relieved, the home-voyage was undertaken three days after the onset of the attack. The patient grew steadily worse, vomited daily, retained absolutely no nourishment, and required morphine for the relief of pain. The ship's surgeon, Dr. S. R. Radmore, of the "Teutonic," felt himself fortunate in turning over the patient alive to the late Dr. Goldthwaite, of New York. Our late fellow, Dr. Loomis, saw the patient the night of his arrival; I saw him the next morning. The striking features of the case at the time were those of prostration, suggesting shock and toxæmia. A possible appendicitis was considered by Dr. Loomis, but he was not prepared to make a positive diagnosis nor to advise operation. I did not see the patient again for three days, when I returned to escort him to Buffalo. He was then in coma, and died six hours after reaching home.

---

[1] Read before the Association of American Physicians, May 30, 1895.

There were present during the last days general abdominal tenderness, moderate pain and tympany, no induration, the temperature never above 100°, and the pulse frequent and very feeble. Koumys, whiskey, and water were retained in fair quantity. The alvine evacuations appeared natural. Dr. Goldthwaite reported the urine free from albumin and sugar, although Dr. Radmore had found albumin present during the voyage. Catheterization was required before the use of anodyne. The diagnosis was not made. The general expression of the case was not unlike that of uræmia, but there was more abdominal tenderness and pain than seemed consistent with such a condition alone. The morbid anatomy is described further on by Dr. H. U. Williams.

Eleven days later, October 29th, there appeared in my ward at the Buffalo General Hospital, a Swede, E. A., male, aged thirty-nine years, a laborer. For three weeks preceding he had been under the care of Dr. W. H. Slacer, who reported that the man had been taken ill while at work some weeks prior with abdominal pain and nausea. At the time of examination, October 9th, the pulse was weak, counted 90, and the temperature marked 101°. The patient was emaciated, anæmic, slightly icteric, the tongue heavily coated, constipated, the feces light yellow and offensive. The urine was said to be natural in color and quantity, specific gravity 1024, with absence of sugar, albumin, and sediment.

The stomach was distended with gas; there was great tenderness over the stomach and to the right of the umbilicus. There were anorexia, great thirst, and occasional vomiting. Dr. Slacer attended the man for chills and fever one year before, from which he had made a complete recovery.

When received into the hospital the patient was greatly prostrated, and complained of sharp, lancinating abdominal pain, especially in the region of the umbilicus. There was general abdominal tenderness, slight tympany, but no perceptible induration.

As to his general condition, the skin was muddy and slightly icteric, the tongue was heavily coated, the pulse varied from 80 to 90 and was very feeble, the temperature was 99°. Time did not permit of a thorough examination of the urine, but it was found free from albumin and sugar. The man was unable to retain nourishment. He was given nutrient enemata, besides digitalis and strychnine hypodermatically. Morphine was repeatedly required for the relief of pain. This case resembled so closely the one previously described that I was much disappointed to find on the following day that the patient was dead, without a diagnosis having been made. The similarity of the cases will appear more striking after hearing Dr. Williams's report of the post-mortem examinations.

October 18, 1894, 4 P. M. Mr. E. L. H., Swede, aged fifty-nine years; dead thirteen hours. Rigor mortis firm in legs, not so well marked in arms; body appears well nourished; post-mortem lividity present over the back; subcutaneous fat 18 mm. thick over the thorax, 30 mm. thick over the abdomen; muscles of thoracic and abdominal walls scantily developed; costal cartilages calcified. Left lung free throughout; right lung adherent at apex; both lungs crepitated well and appeared normal; moderate congestion and œdema posteriorly. No unusual amount of pericardial fluid; valves of heart normal; muscles of left ventricle somewhat thinned, soft; cavity of left ventricle slightly dilated; aortic intima fatty. Spleen small, dark, and friable. Liver rather small, slightly fatty. Gall-bladder small, walls thickened, containing numerous dark gall-stones the size of buckshot. Mucous membrane of stomach, small and large intestines appeared normal; that of the large intestine showed white dots the size of a pin's head, scarcely noticeable; appendix 30 mm. in length, size of chicken-quill in diameter; except for its small size, normal. Kidneys imbedded in abundant fat, of each the capsule stripped off easily; parenchyma pale, cortex narrow; two small cysts on the surface of the right kidney. Urinary bladder contained about four ounces of urine; mucous membrane normal.

Most interesting was the condition of the fatty tissues of the abdominal cavity. The subperitoneal fat and that of the mesentery, mesocolon, and omentum was abundant. Imbedded in the fat of the omentum, mesentery, and mesocolon were great numbers of round, hard, white masses of variable size, mostly smaller than buckshot, white and opaque on section. In the mesocolon they were extremely abundant, often soft, and becoming confluent, making a pultaceous mass. The same condition prevailed in an extreme degree in the retroperitoneal fat behind the colon, stomach, and spleen.

Removal of the spleen revealed a large cavity, extending downward between the left kidney, the colon, and the stomach, containing a soft, cheesy substance resembling pus, with masses nearly as large as a pea, of firmer consistence. The fatty tissues bounding this cavity were grayish and necrotic in appearance. In this cavity lay the pancreas, surrounded by the same kind of material, some of which also was adherent to it. The fat about the kidney was sharply separated from the other retroperitoneal fat, and was unaltered, as was the fat of the anterior abdominal and thoracic walls.

The pancreas was eighteen centimetres in length, and to the unaided eye the parenchyma appeared normal; the duct of Wirsung was normally situated and was patulous. Microscopic examination showed its wall to be denuded of epithelium, except in the deeper folds, in which the epithelium refused to stain; the other tissues of the duct also stained badly; no cell-infiltration into it or around it was observed. On microscopic examination of the parenchyma of the pancreas the epithelium was found to take no nuclear stain at all in sections made at a number of points between the head and tail. The epithelium of the ducts behaved in a similar manner. The amount of interstitial connective tissue was not unusual. Over small areas it was moderately infiltrated with fat. A region of this character near the tail showed a small spot of fat-necrosis, having the character to be described later. The capsule for the most part was not thickened, and exhibited no cell-infiltration; near the tail it was slightly thickened and showed a small hemorrhage; it contained numerous round, oval, and spindle-shaped nuclei. No bacteria could be demonstrated in this pancreas, except in a single section from near the head, in which the duct of Wirsung contained numerous short, plump bacilli with rounded ends.

October 31, 1894, 4 P. M. Mr. E. A., aged thirty-nine years; dead fourteen hours. Rigor mortis firm; well formed, but slim; post-mortem discoloration well marked in buttocks, back, backs of arms, and neck; a number of dark spots in skin of anterior surface of right thigh, right upper arm, and left hip. Subcutaneous fat over thorax 6 mm. thick, over abdomen 18 mm. thick; subperitoneal fat well developed. Both lungs free from adhesions; pleural cavity empty; lungs small, crepitated well, and were normal; right weighed 13 ounces, left 9 ounces.[1] Pericardial cavity free from fluid; heart of normal size, weight 8½ ounces; usual amount of subpericardial fat; right ventricle contained large yellow clot, valves normal, muscle of ventricle of usual thickness and healthy; aorta moderately atheromatous. Spleen weighed 7 ounces, of normal appearance. Liver appeared fatty; centres of lobules congested. Gall-bladder dilated, encroaching on anterior surface of liver, which was notched correspondingly; its shape was unusual, being constricted about the middle, and the cystic duct compressed by a fibrous band; bile passed freely into the duodenum on pressure, however. Mucous membrane of stomach and duodenum normal; that of jejunum congested and œdematous, covered with mucus; ileum less so, except the lower two feet, which were congested. About three feet above the ileo-cæcal valve ileum was bound down by a recent-appearing adhesion, not very firm. Breaking of this adhesion disclosed behind it a cavity as large as a walnut, containing fluid resembling pus and small, harder masses. Appendix vermiformis 8.8 cm. in length, of which 7.5 cm. were free; tissue about the cæcum normal; mucous membrane of the colon near the splenic flexure necrotic and easily torn; colon beyond this point congested; contents yellowish, semifluid. Kidneys weighed 5½ ounces each; capsules stripped off with ease, appeared a little swollen; cortices very pale, medullæ dark; suprarenal bodies normal in size and appearance.

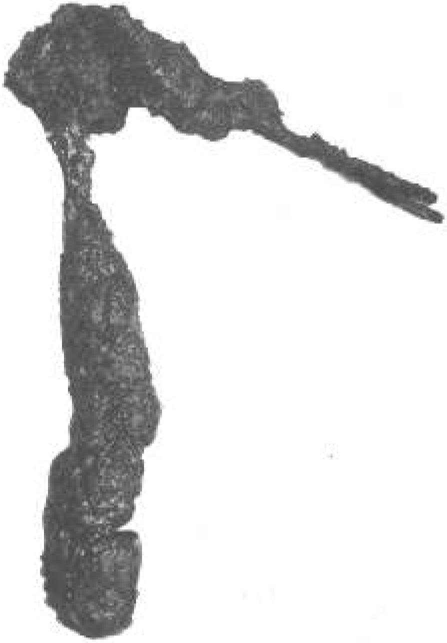
The peritoneum showed no congestion or exudate; beneath it the fatty tissues of the abdominal wall were sparingly dotted with small, hard, white nodules; the same were present in larger numbers in the mesentery; they were seen about the cæcum. Removal of the spleen disclosed a mass of necrotic tissue, soft, grayish, containing fluid resembling pus, small, hard, white masses, and others easily crushed between the fingers. This condition extended through the retroperitoneal fat-tissue to the splenic flexure of the colon. The necrotic portion of the colon already mentioned was in contact with black necrotic tissue behind it.

The fatty tissues about the pancreas were included in the same necrotic area. The outer surface of the pancreas was grayish-black, and dotted with the same white masses. The pancreas was 26 centimetres in length; weight, 2½ ounces. The head was large, quadrilateral, margin angular, sharply separated from the rest of the organ, which was united with the head by a constricted portion, about the size of a lead-pencil. (See Fig. 1.) Section of the pancreas showed it to be hard, fibrous tissue present in abnormal amount; parenchyma unusually reddened. The duct of Wirsung was patulous; microscopic examination showed its epithelium attached for the most part and well stained, and its walls appeared otherwise normal. In a section made through the head one of the large ducts was seen to be filled with desquamated epithelium and small round cells; this was not observed in other ducts. The epithelium of the parenchyma took the nuclear stain poorly. Occasionally small areas were observed not having any nuclear stain at all. The amount of interstitial connective tissue was unusual; it contained numerous nuclei and small hemorrhagic spots; number of fat-cells not striking. A section made through the constricted part of the pancreas mentioned showed two spots of fat-necrosis. The capsule was thick, consisting of fibrous tissue, with numerous round, oval, and spindle-shaped nuclei and hemorrhagic areas.

---

[1] The scale employed was a common grocer's scale. It seemed best to give the weights as they were taken

FIG. 1.



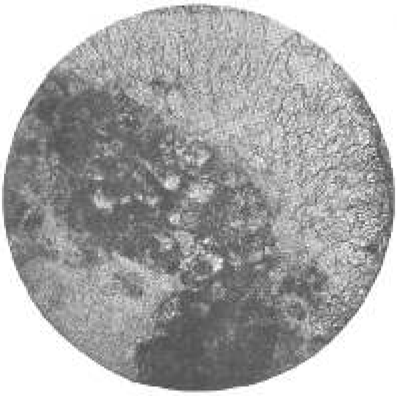
Pancreas. Case II. (× ⅓.)

Numerous bacilli, small and large, often forming strings, with square ends, were found in the capsule, extending to a less degree into the interstitial tissue between the acini for a short distance from the capsule.

Microscopic examination of the duodenum showed very large numbers of goblet-cells in the epithelial lining, moderate congestion, no cell-infiltration.

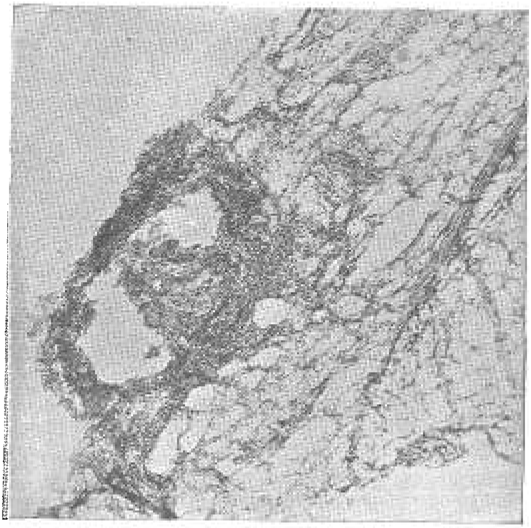
The histological appearances of the necrotic fat-material were identical in the two cases; they will therefore be described together. The pultaceous fluid consisted of opaque masses and granules, highly refracting globules, and needle-shaped crystals. Frozen sections of the white necrotic nodules showed them to be made up of similar coarse granules and masses, globules and crystals, and a small amount of masses of brown pigment. Some of them appeared to be enclosed in part by a

FIG. 2.



Frozen section of area of necrotic fat at its margin. Case I.

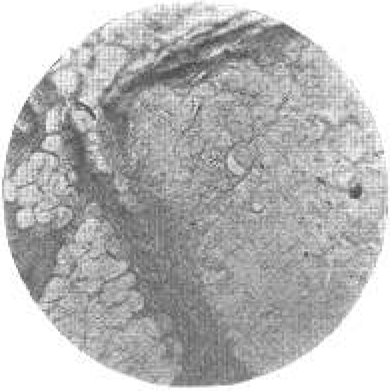
FIG. 3.



Fatty necrotic area, showing cell-infiltration after removal of fat and calcium-salts by ether and acetic acid, and staining with carmine.

definite connective-tissue boundary. The surrounding tissue was moderately congested; a few small extravasations were noted; the fat cells appeared normal. (Fig. 2.) Sections of the same imbedded in celloidin and stained with hæmotoxylin or carmine gave similar results. In them, however, the presence of a connective-tissue boundary to the spots of fat-necrosis was often demonstrated, even to the extent of forming a thick capsule. There was marked infiltration of this capsule and less of the underlying part, with cells having good-sized, round, oval, or spindle-shaped nuclei. The relatively healthy fat-tissue sometimes showed an increased number of nuclei. (Fig. 3.) Furthermore, owing to the partial solution of the opaque material by the ether used in imbedding, the outlines of what appeared to be fat-cells could be plainly seen in parts of these necrotic areas; and strands of connective tissue were visible traversing the areas. (Fig. 4.) Frozen sections of the spots of fat-necrosis were partially cleared up by the use of either ether or acetic acid; when the two reagents were used successively the opacity disappeared entirely. Evidently ether dissolved the fatty material, leaving an opaque substance, soluble in acetic acid; probably some calcium-compound. Analyses made by Dr. Lytle, Instructor in Chemistry, show the necrotic nodules to contain calcium phosphate in abundance, other earthy salts sparingly or in traces. These results are partly in accordance with the observations of Langerhans,[1] who found calcium in combination with fatty acids. Since our analyses were qualitative only, the possibility that enough calcium may have been present to unite with some of the fatty acids as well as the phosphoric acid is not excluded.

FIG. 4.



Margin of nodule of fat-necrosis, showing connective-tissue boundary and nuclei in it, and outlines of what appear to be fat-cells within the nodule. (Imbedded in celloidin, stained in carmine. × 130.)

The prominence of the nodules of fat-necrosis and the condensation of the connective tissue in front of them point toward an increase in size from a deposit of new material in them. It has already been noted that relatively unaltered fat-cells and strands of connective tissue were to be seen within them. The congestion, hemorrhages, and cell-infiltration indicate an inflammatory reaction about them.[1] Many sections appear to justify the view of Langerhans that the connective-tissue boundary of the necrotic nodule coincides with the connective tissue originally surrounding a fat-tissue lobule.

---

[1] Langerhans: "Uber multiple Fettgewebsnekrose." Virchow's Archiv, 1890, p. 122.

Numerous bacilli were found between the fat-cells about the spots of fat-necrosis in Case II.; large rods with square ends were most numerous; some smaller forms with rounded ends were also seen. They were not detected in the spots of fat necrosis themselves, nor were they more noticeable in their immediate vicinity than at some distance removed.

No bacteria could be found with the microscope in the fatty tissues of Case I., and unfortunately the circumstances attending the autopsy prevented the use of culture-methods. In Case II., however, inoculations were made both from the pancreas and the necrotic fat. From each a variety of bacillus was isolated in pure culture.

From the fat a bacillus was obtained, having rounded ends, growing both as short oval forms and as long filaments, actively motile, liquefying gelatine rapidly, and flourishing on the ordinary culture-media. It appears to be a variety of Proteus. Broth cultures injected into the abdominal subcutaneous tissues of rabbits evoked local suppuration; nothing resembling fat-necrosis was produced. From the pancreas a bacillus with rounded ends was isolated, growing both as short, oval, and long filamentary forms, not motile, or but slightly so, not liquefying gelatine, growing on the ordinary culture-media, coagulating milk, producing gas and acid reaction in 2 per cent. glucose-bouillon, giving a faint indol reaction in peptone solution, and in all respects behaving like Bacillus *coli communis*. *Broth-cultures injected into the* subcutaneous tissues of the abdominal wall of rabbits evoked local suppuration, but nothing like fat-necrosis could be found. Welch found the colon bacillus in the necrotic fat.

We do not appear, in either of these forms, to have secured the large bacillus with square ends seen in sections of the pancreas and fat-tissues. We are not, however, disposed to lay much stress upon it or upon them. It will be remembered that the pancreas lay, floating almost, in a cavity filled with a kind of pultaceous *débris*, and that this cavity was in part bounded by the splenic flexure of the colon, whose mucous membrane was in a necrotic condition. Under these circumstances the penetration of bacteria into the pancreas and fat to the extent observed is not surprising.

Furthermore, the histological alterations seen in the pancreas in each of the cases are probably accounted for by the condition of the surrounding tissues. Beyond the presence of a limited number of very small areas of fat-necrosis in the interstitial tissues of the gland and the occurrence of small hemorrhages, the organ in neither case showed more change than we have often seen in the perfectly healthy pancreas taken from the cadaver and preserved in the same manner as in those in question.

---

[1] Chiari: "Ueber die segenannte Fettnekrose." Prager medicinische Wochenschrift, 1883, No. 30.

Perhaps the most striking feature of the cases under discussion is the existence in both of well-marked disseminated fat-necrosis, and in neither of well-marked pancreatic change. Chiari mentions having had a case of the same kind. The experience of most observers has been otherwise.[1]

It is noteworthy that in each of our cases there was abnormality of the gall-bladder; in the first in the shape of gall-stones, in the second in fibrous adhesions, the result of previous inflammation.

We are indebted to Prof. H. M. Hill, of Buffalo, for Figs. 1, 2, and 3, and to Dr. A. G. Hoen, of Baltimore, for Fig. 4.

A CASE OF LARGE, ROUND-CELLED SARCOMA OF THE TONGUE.

By Edward K. Dunham, M.D.

A tumor of the tongue, which upon microscopical examination proved to be a sarcoma, composed chiefly of large, round cells, was removed from a man sixty-one years of age, by Dr. J. D. Bryant, at Bellevue Hospital, New York, on January 27, 1894. Such sarcomata of the tongue are so unusual that this case seems worthy of record:

The clinical history is meagre. The parents of the patient are both dead; the father from some unknown cause, the mother from "old age," at seventy-three years. The patient had one brother and four sisters. The brother and one sister died of tuberculosis, the three other sisters are alive and well.

The patient has had good general health. He can recall having had malaria forty years ago, and has had some rheumatic pains in the right shoulder during the past year. He has been a moderate drinker, and has smoked a good deal, averaging about ten pipes a day.

Eight months before the operation he says that he bit his tongue, causing a blister, which did not disappear, but became irritated by contact with decayed teeth, and after about three months began to grow hard. From that time it grew slowly until a tumor three-quarters of an inch in diameter had been formed. He then applied for treatment.

The tumor was on the right border of the tongue, about an inch from the tip, or opposite the first bicuspid teeth. It was globular in form, smooth except for a few prominent papillæ on the upper surface, and presented no ulcerations. Its attachment to the tongue was broad, and not pedunculated. After its removal incision of the tumor revealed an almost perfectly spherical, light pinkish-gray neoplasm, of apparently uniform structure and moderately firm to the touch. The mucous membrane of the tongue could be traced as a thin covering over the whole surface of the growth, which did not appear to infiltrate the under-

---

[1] Fitz: Medical News, vol. liv., 1889.